

Remarks

In response to the Final Office Action mailed April 11, 2008 (hereafter "Office Action"), no amendments have been made. Accordingly, claims 60-78 are pending.

Reconsideration and allowance based on the following remarks are respectfully requested.

Rejections under 35 U.S.C §§ 102-103

Claims 60-78 stand rejected under 35 U.S.C § 102(b) as allegedly being anticipated by, or in the alternative, under 35 U.S.C § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,076,867 to McKenzie ("McKenzie"). Applicant traverses this rejection for at least the following reasons.

Applicants submit the cited portions of McKenzie do not teach or render obvious a method of forming a gassed emulsion explosive composition, as recited in claim 60, comprising:

(a) forming a gasser solution comprising a solution of an inorganic nitrite, an ammonium species and optionally an accelerator;

(b) adding the gasser solution to an emulsion explosive composition having a discontinuous aqueous phase comprising inorganic oxygen releasing salts, a continuous water immiscible organic phase and a poly[alk(en)yl] succinic anhydride based emulsifier such that droplets of gasser composition are distributed throughout the emulsion explosive composition; and

(c) allowing the inorganic nitrite and the ammonium species of the gasser solution to react and form gas which is distributed as bubbles throughout the emulsion to form the gassed emulsion explosive composition;

wherein the gasser solution is formed during or immediately before addition of the gasser solution to the emulsion explosive composition by mixing the inorganic nitrite, ammonium species and optionally the accelerator, and wherein the reaction between the inorganic nitrite and the ammonium species occurs within droplets of the gasser solution such that there is substantially no chemical attack on the emulsifier.

- A. **McKenzie does not teach or suggest forming a gasser solution comprising a solution of an inorganic nitrite, an ammonium species and optionally an accelerator ... wherein the gasser solution is formed during or immediately before addition of the gasser solution to the emulsion explosive composition by mixing the inorganic nitrite, ammonium species and optionally the accelerator.**

The Office Action asserts that "McKenzie discloses a water-in-oil emulsion that is formed by mixing nitrite, oxidizer salt, and thiourea and subsequently adding this solution to the emulsifier and the fuel (see col. 4, lines 30-68)." [Office Action, pg. 2]. Applicant disagrees with this assertion for *at least* the reason that the Office Action has mischaracterized McKenzie.

McKenzie does not teach or suggest the claimed gasser solution. For example, column 4, lines 30-68 of McKenzie describes conventional ways in which emulsions may be gassed in order to sensitise them. Two approaches are described, (1) chemical gassing; and (2) the inclusion of physical gassing agents as hollow spheres or particles.

In relation to chemical gassing, it is evident that this involves adding sodium nitrite to an emulsion that already contains a gassing accelerator such as thiourea in the oxidiser phase. Indeed, column 4, lines 36-39 clearly states that:

A sodium nitrite/thiourea combination begins producing gas bubbles immediately upon addition of the nitrite to the oxidizer solution containing the thiourea...

[Emphasis added].

Thus, this aspect of McKenzie does not describe mixing nitrite, oxidiser salt and thiourea, and subsequently adding this solution to emulsifier and fuel. Rather, McKenzie discloses forming an emulsion comprising an oxidiser salt and fuel in which thiourea is contained within the oxidiser phase. This emulsion, containing thiourea, is then gassed when sodium nitrite is added. The Examiner's assessment of what is disclosed in McKenzie is therefore, fundamentally incorrect and has no bearing to the claimed invention.

In this regard, claim 60 of the present application requires as step (a) forming a gasser solution comprising a solution of an inorganic nitrite, an ammonium species and optionally an accelerator. According to step (b) this gasser solution is then added to an emulsion explosive having a discontinuous aqueous phase comprising inorganic oxygen releasing salts, a continuous

water immiscible organic phase and a polyalkenyl succinic anhydride based emulsifier. The significance of this emulsion is described in more detail below. Further, claim 60 recites that the gasser solution is formed during or immediately before addition of the gasser solution to the emulsion explosive composition by mixing the inorganic nitrite, ammonium species and optionally the accelerator.

Thus, the gasser solution formed in accordance with the claimed invention comprises an inorganic nitrite, and ammonium species and optionally an accelerator. However, there is no disclosure or suggestion in McKenzie of forming a gasser solution comprising an inorganic nitrite and ammonium species. Furthermore, it will be noted that McKenzie teaches use of an accelerator in the oxidiser phase of the emulsion, whereas it is permissible in accordance with claim 60 that an accelerator is present in solution in combination with inorganic nitrite and ammonium species. As such, it will be appreciated that the type of approach for gassing adopted by McKenzie is fundamentally different from that in the claimed invention.

Column 4, lines 46-51 of McKenzie describe gassing using hollow spheres or particles (microballoons). However, it is not clear how this is relevant since gassing in the claimed invention takes place by a chemical approach.

For at least the foregoing reasons, there is no disclosure or suggestion in McKenzie of forming a gasser solution comprising an inorganic nitrite, an ammonium species and optionally an accelerator, ... wherein the gasser solution is formed during or immediately before addition of the gasser solution to the emulsion explosive composition by mixing the inorganic nitrite, ammonium species and optionally the accelerator. Accordingly, Applicant submits that claim 60 is neither anticipated, nor render obvious by McKenzie.

- B. McKenzie does not teach or suggest adding the gasser solution to an emulsion explosive composition having a discontinuous aqueous phase comprising inorganic oxygen releasing salts, a continuous water immiscible organic phase and a poly[alk(en)yl] succinic anhydride based emulsifier such that droplets of gasser composition are distributed throughout the emulsion explosive composition.**

The Office Action also alleges that McKenzie teaches the use of PIBSA as surfactant, and alleges that this PIBSA is the same as the PIBSA referred to in step (b) of claim 60 of the present application. [See Office Action, pages 2-3].

In the claimed invention, PIBSA is used as the surfactant/emulsifier for forming the emulsion explosive composition to which the gasser solution is added. By contrast, in McKenzie, PIBSA is a surfactant that is added to ammonium nitrate (AN) or the fuel component of ammonium nitrate fuel oil (ANFO) rather than being the surfactant that is used to form the emulsion *per se*. This should be apparent from the following discussion of McKenzie.

McKenzie is directed to solving the inherent instability of emulsion explosives based on emulsion and AN or ANFO prills. [See column 1, line 49 – column 2, line 8]. If the emulsion is weakened or becomes unstable, crystallisation or solidification of droplets results. [See column 1, lines 56-61]. The addition of solid components, such as AN or ANFO prills, to emulsion explosives, tends to result in additional destabilization. [See column 1, lines 61-66]. The aim of McKenzie is to enhance the stability of emulsion explosive compositions that contain AN or ANFO prills. [column 2, lines 9-19]. This is achieved by addition of a surfactant to the AN prills or dissolution of a surfactant in the liquid organic fuel of ANFO prills prior to addition of the liquid fuel to the prills (in order to form ANFO prills – column 3, lines 15-30). McKenzie states that “it has been found that use of a surfactant in this manner imparts greatly increased stability to the resulting emulsion and AN or ANFO prills mixture. By 'stability' is meant that the emulsion phase of the emulsion and AN or ANFO prills mixture remains a stable emulsion, i.e., does not appreciably break down or experience crystallization of the discontinuous oxidising salt phase over a given period of time.” [See column 1, lines 32-39].

In this regard, the surfactant mentioned in McKenzie is not the same as a surfactant used to form the emulsion itself. Indeed, while McKenzie does refer to the use of PIBSA surfactants, it is only in the context of addition to AN prills or dissolution of surfactant in the liquid organic fuel of ANFO prills prior to addition of the liquid fuel component to the AN prills. [See column 3, lines 9-10].

McKenzie does of course teach formation of a water-in-oil emulsion using a *conventional emulsifier* (sometimes known as a surfactant). However, no reference is made to the use of

PIBSA-based emulsifiers [*Cf.* column 3, line 31 – column 4, line 32]. Thus, it is quite clear that when a PIBSA surfactant is being discussed in McKenzie it is the surfactant that is added to the prills and not a surfactant/emulsifier that is used in the forming the water-in-oil emulsion. The Office Action fails to appreciate this distinction.

For at least the foregoing reasons, there is no disclosure or suggestion in McKenzie of adding the gasser solution to an emulsion explosive composition having a discontinuous aqueous phase comprising inorganic oxygen releasing salts, a continuous water immiscible organic phase and a poly[alk(en)yl] succinic anhydride based emulsifier such that droplets of gasser composition are distributed throughout the emulsion explosive composition. Accordingly, Applicant submits that claim 60 is neither anticipated, nor rendered obvious by McKenzie.

C. McKenzie does not teach or suggest allowing the inorganic nitrite and the ammonium species of the gasser solution to react and form gas which is distributed as bubbles throughout the emulsion to form the gassed emulsion explosive composition ... wherein the reaction between the inorganic nitrite and the ammonium species occurs within droplets of the gasser solution such that there is substantially no chemical attack on the emulsifier.

In contrast, the claimed invention is directed to a particular problem associated with chemical gassing of emulsions that are formulated using PIBSA-based emulsifier. Thus, one of the main problems associated with the use of nitrite gassing agents is that nitroso species are generated during the gassing reaction and these may react with functional moieties on the headgroup of the (PIBSA) emulsifier used to produce the emulsion. [*See* page 3, line 27 – page 4, line 10 of the Specification]. Reaction between the nitroso species and the emulsifier causes chemical changes in the emulsifier and this can have a damaging effect on the emulsifying capability of the emulsifier, subsequently leading to break down of the emulsion into discreet aqueous and oil phases [*See* page 3, line 27 – page 4, line 10]. The claimed invention seeks to address this problem by formulating a gassing agent comprising inorganic nitrate, ammonium species and optionally an accelerator. This gassing agent is formed before addition to the emulsion and the chemical gassing reaction that takes place occurs within droplets of the gasser solution within the emulsion such that there is substantially no chemical attack on the emulsifier [*See* the last limitation of claim 60]. It will be appreciated from this, and from the foregoing, that

the claimed invention relates to a fundamentally different problem from that addressed by McKenzie.

The Office Action also alleges that "...the amounts of each component are indicated in col. 2 and 3. Col. 4, lines 44-50 also indicates that microballoons can be used in addition to the thiourea/nitrite combination." [Office Action, page 2]. The significance of this point is not understood. The amounts disclosed at column 3, lines 15-30 of McKenzie are the amounts of surfactant added to the AN prills or to the fuel portion of ANFO prills. This has nothing to do with the claimed invention. Column 3, lines 31-61 discusses formation of a conventional emulsion explosive composition. However, the claimed invention does not claim such compositions *per se*.

The Office Action also asserts that "... it would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the parameters of the emulsion such as pH, amounts and density to achieve a desired result." [Office Action, page 2]. Again, the relevance of these points is not understood. McKenzie simply does not teach or suggest the claimed gasser solution, i.e. one including an inorganic nitrite, ammonium species and possibly an accelerator, nor the claimed emulsifier, used in accordance with the claimed invention. Thus, variation in parameters such as pH, amounts and density are incidental and do not address any of the shortcomings when one considers the differences between the disclosure of McKenzie and the claimed invention.

In response to arguments submitted by the Applicant, the Office Action alleges that "Applicant's arguments that McKenzie is not the same type of emulsion as that of the instant invention are unpersuasive." [Office Action, page 3]. However, this is a very important distinction since it goes to the very heart of the claimed invention. The claimed invention addresses a problem associated with destabilisation of an emulsion as a result of chemical gassing. By contrast, McKenzie deals with the problem associated with including AN or ANFO prills and the destabilising effect that this can have. These are different problems having materially different solutions.

The Office Action also notes that McKenzie does disclose the mixing steps and also uses PIBSA and that amounts of components and use of microballoons is disclosed. [See Office

Action, page 3]. However, as explained above, McKenzie does not disclose the formation of the same type of gasser solution, and thus does not disclose the same mixing steps as required by claim 60. While McKenzie does mention the use of PIBSA, it is not in the same context as the claimed invention. Thus, any disclosure of amounts between McKenzie and the claimed invention are merely incidental. The use of microballoons is disclosed in McKenzie, but it is not clear how this is relevant, since the claimed invention requires chemical gassing of an emulsion explosive. The use of microballoons is a physical methodology by which gassing may be achieved.

For at least the foregoing reasons, there is no disclosure or suggestion in McKenzie of allowing the inorganic nitrite and the ammonium species of the gasser solution to react and form gas which is distributed as bubbles throughout the emulsion to form the gassed emulsion explosive composition, ... wherein the reaction between the inorganic nitrite and the ammonium species occurs within droplets of the gasser solution such that there is substantially no chemical attack on the emulsifier.

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For *at least* the foregoing reasons, the rejection of claim 60 under 35 U.S.C. § 102(b), or alternatively under 35 U.S.C. § 103(a) based on McKenzie is improper and should be withdrawn. Dependent claims 61-78 are patentable for at least the reason that they depend from claim 60 as well as for the further features they recite individually.

Conclusion

Having addressed each of the foregoing rejections, it is respectfully submitted that a full and complete response has been made to the outstanding Office Action and, as such, the application is in condition for allowance. Notice to that effect is respectfully requested.

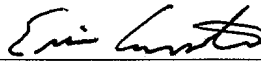
If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

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